Netflix wants to shrink your favorite TV show's carbon footprint

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There's a soft, afternoon glow suffusing an intimate scene between the plucky protagonist and her wood-chopping, flannel-shirted love interest's mother on the Vancouver set of the Netflix Inc. show, "Virgin River." A

soapy drama centered on a nurse practitioner in a small, northern California town, "Virgin River" is the kind of show that reliably delivers buried secrets, thwarted villains and reunited lovers. That fake sunlight— the combined power of two massive 18,000-watt lights running on a giant battery—is how Netflix wants to clean up the dirty business of Hollywood productions.

On most film and television sets, illumination is powered by loud, clunking diesel generators. "Virgin River" is one of a number of Netflix's productions replacing generators and fossil fuel-based transportation with greener alternatives. In Atlanta, "Stranger Things" is dabbling with solar-powered trailers, and just outside London, "Bridgerton" has tested a hydrogen power unit.

It's all part of Netflix's plan to cut its emissions roughly in half by 2030. Yet, Netflix's progress has been marginal in the three years since it began focusing on sustainability in 2020.

Its emissions in 2022 increased compared to 2019, the year the company chose as its baseline year. (Emissions dropped dramatically in 2023, the company's latest reported year, but that was largely attributed to work stoppages during the Hollywood strikes.)

"Part of it is that we don't have direct operational control," says Emma Stewart, whose job as sustainability officer includes driving down emissions. Focusing on film and TV production is key, since those activities are typically responsible for over half the company's emissions.

Aside from one studio in Albuquerque, Netflix generally doesn't own any of the equipment or studio space for its productions. (In that studio, the company has invested in geothermal water loops, solar and battery storage systems and EV fast chargers.) While the company could mandate emissions-reducing behavior from its vendors, landlords and

productions, Stewart believes "creating carrots that we think are as big as sticks" is a better approach.

Since its black and white beginnings, the film industry has spawned a thriving but distributed global ecosystem of local vendors who supply its specialty gear: lights, cameras, trucks, cables and generators. Getting all of these disparate units to change how they do business is not an easy task, even with big carrots.

If Netflix persuaded its suppliers to buy low-emissions equipment, it could prompt an industry-wide change. Netflix's emissions are broadly in line with its industry peers, and its challenges are the same.

The same shops that rent lights, portable power sources and vehicles tend to service productions across the various studios, and so more green tech for Netflix means more all around. And if the company succeeds in communicating to the makers of this equipment that a buyer exists, that would help de-risk the investment and encourage more adoption industry-wide.

Doing so would be a considerable feat. Though the entertainment industry's carbon footprint is generally small compared to more emissions-intensive sectors like technology and aviation, its societal influence is arguably greater. Hollywood's mark on culture and norms is one that can't be overstated and could inspire a larger shift in how corporations at large prioritize sustainability.

Netflix is not alone in struggling to meet its lofty climate ambitions. At the beginning of the decade, major corporations across the globe voluntarily started setting climate goals to great fanfare.

As 2030 looms closer, companies have started to backslide. Microsoft Corp. and Alphabet Inc. have seen their emissions shoot up amid the rise

of energy-intensive artificial intelligence, making their climate targets harder to reach. Shell Plc, BP Plc and Amazon.com Inc. have all scaled back or dropped parts of their climate goals.

Some companies that haven't dialed back their ambitions use questionable methods to appear sustainable while they continue emitting. Netflix relies on tools like renewable energy certificates (RECs) and carbon credits of contested value to claim sustainability while it slowly scales up efforts like those taking place on the "Virgin River" set. Studies have shown that those efforts do more for greenwashing than getting the world closer to net zero.

Netflix is testing whether it's possible to grow audiences and ambitions while cutting greenhouse gases. What it's revealing is that prioritizing aggressive revenue growth and maintaining its spot as the world's top streamer make it hard to reach its climate goals; its sustainability efforts take a backseat to the will and vision of Netflix's creatives, who literally run the show.

"Getting the shot is still paramount, and that's often not an environmentally efficient or responsible way to approach it," says Hunter Vaughan, a University of Cambridge researcher and the author of Hollywood's Dirtiest Secret: The Hidden Environmental Costs of the Movies. "Without challenging these ideological foundations, the real positive change isn't going to happen."

It's hard to overstate the scope of Netflix's growth and influence. Since its start in 1997 as a DVD mailer, it has reshaped the entertainment industry. Today, Netflix accounts for about 8% of TV viewing in the U.S.; it's a leading network in most of the world's major markets. The company estimates its audience numbers at over a half a billion. It's on track for almost $40 billion in sales this year.

As the company strives to make hits and please investors, Stewart has to cut emissions, overhaul onset norms and encourage a tech transition. Stewart joined the company in 2020, when Netflix started its sustainability work. Since that time, Netflix has had two years of regular business activity, unimpeded by a global pandemic or industry-wide strikes.

Those circumstances resulted in artificially-lowered emissions. During the normal years, 2021 and 2022, Netflix increased its Scope 1 and 2 emissions (that's emissions directly related to its business or energy consumed by its operations), compared to 2019. Carbon-cutting progress has been outpaced by the company's growth.

"The number of productions changes from one year to the next," Stewart says. The company's goal is to "decouple [the] number of productions from our company-wide carbon footprint."

What that means is that, in an ideal world, even as the number of productions go up, emissions go down. "We're definitely not there yet," Stewart says.

Unlike the consumer goods business, growth for streaming companies doesn't have to depend on the number of things produced, points out Albert Lin, a professor at the University of California, Davis' School of Law who specializes in environmental law. A content company can theoretically gain more subscribers without increasing the number of shows. "You could also imagine growing slowly but better," he says.

Of course, arguing for slow growth is a hard case to make to investors of any company, and it's unlikely that Netflix or any other Hollywood studio will seriously consider this strategy. For now, the streaming giant is focused on the individual changes it can make on each production.

On the set of "Virgin River," while everyone else is mostly oblivious to the energy transition taking place around them, Jeff Harvey is in the heat of it.

Harvey is "Virgin River's" rigging gaffer, which means he oversees all the power and lighting. But now, he's more like a logistics manager. He writes up a "battle plan" that includes where every battery has to go, when it has to be there and what it needs to power, factoring in charging time. "We spend a little less time on setting up, and I spend more time on the front end organizing," Harvey says.

For Rob Fairbridge, whose role as transportation coordinator involves managing a fleet of vehicles, integrating electric cars and trucks on set has involved new daily hurdles. He test-drives each new vehicle for two weeks before production begins to anticipate his drivers' pain points. A car will charge more slowly when it's nearly done, so drivers need to factor that extra time into consideration.

Electric trucks typically have a lower clearance than gas-powered trucks because the batteries are often located on the bottom of the vehicle, so drivers have to consider that when entering or exiting certain driveways to avoid bottoming out. And a lesson learned the hard way: Sometimes the manufacturer's listed range is much higher than reality.

Back at the production's basecamp, or where trucks and trailers are parked in between sets, Fairbridge's drivers are eating lunch. It's a quiet break before they have to drive all the equipment to another location in Burnaby, a neighboring Vancouver suburb, where they'll be filming that afternoon.

These are mostly union crews more used to diesel trucks and gas stations than chargers and Teslas, Fairbridge says. That means he's added another role to his list of responsibilities: driver therapist. He spends a lot of one-

on-one time now coaching them through broken chargers and range anxiety.

"It's not something we can shove down their throats," Fairbridge says. "It's got to be a gradual change."

Their anxiety is not unfounded. One time, Harvey's batteries went down for about 12 minutes after filming ran long. "It all crashed and burned," he recalls. They quickly brought in a diesel generator and got the lights back up, but every minute of filming lost is money down the drain.

Crews face a huge supply problem. The city of Vancouver, where the show is filmed, only has seven of the largest production-ready batteries, and as many as 50 productions are filming in the city at any given time.

In order to secure the greener equipment and get ahead of competition, Netflix reserved all the clean tech it needed to start filming Season 6 of "Virgin River" months before production began, a highly unusual move. The week prior, another local production called Harvey and "begged" him to spare them one of his batteries. He acquiesced only because he had reserved more than he needed.

There's a reason this equipment is hard to find. For vendors, investing in a battery, solar panel or EV is taking an expensive leap of faith that will be embraced by production crews.

Bhugesh "Ben" Patel runs a transportation company called BI Production Works based in Madison, Georgia, serving Atlanta-area film and television shows, including Netflix productions like "Stranger Things." He also has fleets in New York, California, New Mexico and Texas and overall, has invested over $30 million so far to convert BI's trailers to run on solar power rather than diesel generators, as well as $100 million on manufacturing new solar trailers.

Building a solar-powered trailer costs over 50% more than would an equivalent diesel trailer, Patel says, but he offers the trailers at a competitive price, so that he'll get the first call from studios looking to go green. Plus, these trailers require less maintenance than their fossil fuel-powered predecessors.

What works in Vancouver or Atlanta, though, might not work elsewhere. British Columbia has plenty of renewable energy, particularly hydropower, and the local government has offered a slew of green film incentives, such as discounted location fees for productions that use clean energy. In New York, solar trailers don't work as well because of cloudy days and sunlight-blocking high-rise buildings, so Patel's trailers there are typically paired with backup generators.

The payback period for a trailer is about seven to 10 years, so it's a risky investment. He was willing to make it because the studios, including Netflix, made it clear to him they were willing to use his equipment.

"Because it's new technology, people have to accept it," Patel says. "It's been a slow start, no question about that."

Though it's the most visible, decarbonizing film and TV production has been a small piece of Netflix's emissions reduction work. Electric or hybrid vehicles and clean mobile power– like batteries and hydrogen systems– made up 5% of the company's overall avoided emissions in 2022, and 2% in 2023.

The bulk of Netflix's emissions reductions came from purchasing renewable energy, either through its landlords or from local utilities directly through the utilities' green tariff programs. It's not as clear-cut as it might seem.

A green tariff program allows larger utility customers to pay for

renewable energy from a specific project like a solar farm. Though details may differ from state to state and utility to utility, the goal is to help customers meet their energy goals and for utilities to reduce the financial risks associated with building new projects. Stewart says Netflix pays a premium to opt into renewable energy.

Despite their aims, some green tariff programs don't actually result in meaningful emissions reductions; rather, they just shift around the ability to claim ownership of the energy. Experts have found that they sometimes fail to accelerate clean energy development, as well.

The efficacy of the program depends on the age of the asset it's attached to and where it's located. If the project is recently built or not yet online, investing in that green tariff could be a credible claim of emissions reduction. If the project is an existing clean energy plant that opened more than three years ago, "that is essentially having no positive impact on decarbonization," says Killian Daly, executive director of EnergyTag, a nonprofit focused on electricity accounting standards.

Additionally, a number of US states have adopted clean-energy standards requiring a certain percentage of utilities' electricity be carbon-free. So, if a company participates in a green tariff program in one of those states, it's possible that the renewable energy being procured would have been built regardless of the investment, and so the green tariff attached to that project is also rendered meaningless.

"Since Netflix currently only owns one studio property globally, and is a relatively small electricity user in any location, we don't typically invest in onsite renewable energy projects, instead paying a premium to opt into certain utility green tariff programs," a company spokesperson wrote in an email.

For the rest of its emissions that it isn't able to avoid or reduce, Netflix

purchases carbon credits. The company bought more than a million credits in 2021 and 2022; last year, it was a little over 800,000. It's been widely documented that many credits advertise positive climate impacts that never materialize.

"We won't pretend that this entire market is perfect, nor is any market perfect, but what it requires is good oversight, good guidelines and principles and accountability," Stewart says.

The company also does the same with non-renewable electricity that it uses by purchasing renewable energy credits, or RECs. These tools come into play when a company buys certificates from clean power providers instead of switching power sources. Companies use RECs to claim 100% clean power, despite skepticism from environmental critics. These credit purchases often have lower impact because, similar to low-quality green tariff programs, they don't always result in bringing new renewable energy to the grid.

"Unbundled RECs are not what we'd like to be procuring forever," Stewart says, while pointing out that Netflix has few options to change energy supplies at rented facilities it doesn't own. The company is weighing alternatives like power purchase agreements made directly with renewable developers; it also invests in a type of REC aimed at supporting projects in developing countries.

"We're continuing to evaluate what might make sense," Stewart says.

For Netflix to increase the credibility of its claim of supporting global net-zero goals, there's much more it could do. For one, it could invest in more durable carbon removal technologies, like machines that remove carbon from the air, says UC Davis' Lin. It's something that other large companies like Stripe, Alphabet and JPMorgan Chase & Co. have invested millions into already.

Purchasing credits from companies that offer these types of removal are "much more expensive, but [offer] greater certainty with regards to the actual storage and permanence of carbon removal," he says. Although Netflix doesn't disclose how much it pays for its credits, the kinds of projects it's investing in are typically cheaper by an order of magnitude compared to higher quality carbon removal credits.

Taking responsibility for more streaming-related emissions is another step Netflix could take. Currently, its carbon accounting excludes the emissions associated with video streaming on its site, as well as the electricity used by devices to watch its content.

Stewart says that Netflix looks to the Greenhouse Gas Protocol for guidance on how to account for indirect internet- and device-related emissions, and it doesn't specify exactly how the entertainment sector is supposed to treat those emissions, so it chooses not to include them.

But some experts believe that Netflix should count those emissions.

"It's a generous omission of accountability," says Vaughan, who points to the large share of global bandwidth that content providers like Netflix hold, which one report puts at nearly 15% of global downstream internet traffic.

Netflix recognizes that more needs to be done to accelerate the adoption of green tech on sets. The company is making investments to try to boost the green equipment supply chain for its productions. Netflix, Walt Disney Co. and nonprofit RMI started the Clean Mobile Power Initiative last year.

The program gives startups access to a $100,000 convertible note (a loan that is repaid with equity in the company rather than principal and interest), as well as introductions to potential investors and "sandbox

days" on the studios' sets, where they can test out their equipment. It also helps train union members on the new technology.

It launched with 10 startups, ranging from a mobile nanogrid developer to a green hydrogen supplier, to help get their technology production-ready. The 18-month accelerator is still in its early days, and so it's too early to see program results, says RMI's Caroline Winslow, who helps run the program.

Another on-set action that would result in meaningful emissions reductions is setting a carbon budget for each show, capping both the number of productions as well as how much each production is allowed to emit. Currently, producers can be forced to cut a helicopter shot due to financial constraints; with a carbon budget, they would have to nix it if it's too emission-intensive.

But at Netflix, the will of the creative side supersedes such priorities. "We really like to be creator-led," Stewart says.

While Netflix has experimented with mandates on a few productions, it's more interested today in coaxing sustainable change on-set through financial incentives, she says. Productions that want to incorporate sustainable swaps are given a "sustainability allowance" that can be used towards sustainable swaps like batteries and electric vehicles and can't be reallocated to other parts of the budget.

Vaughan believes that more mandates would force a positive shift within the industry's culture. "Creativity flourishes under constraints," he says.

After already having swapped diesel for batteries and added more time for EV charging, production workers might embrace new rules.

"I don't mind change," says Fairbridge, the transportation coordinator on

Virgin River, whose reality is a constant juggle of new restrictions. "And I think the world is going that direction."

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